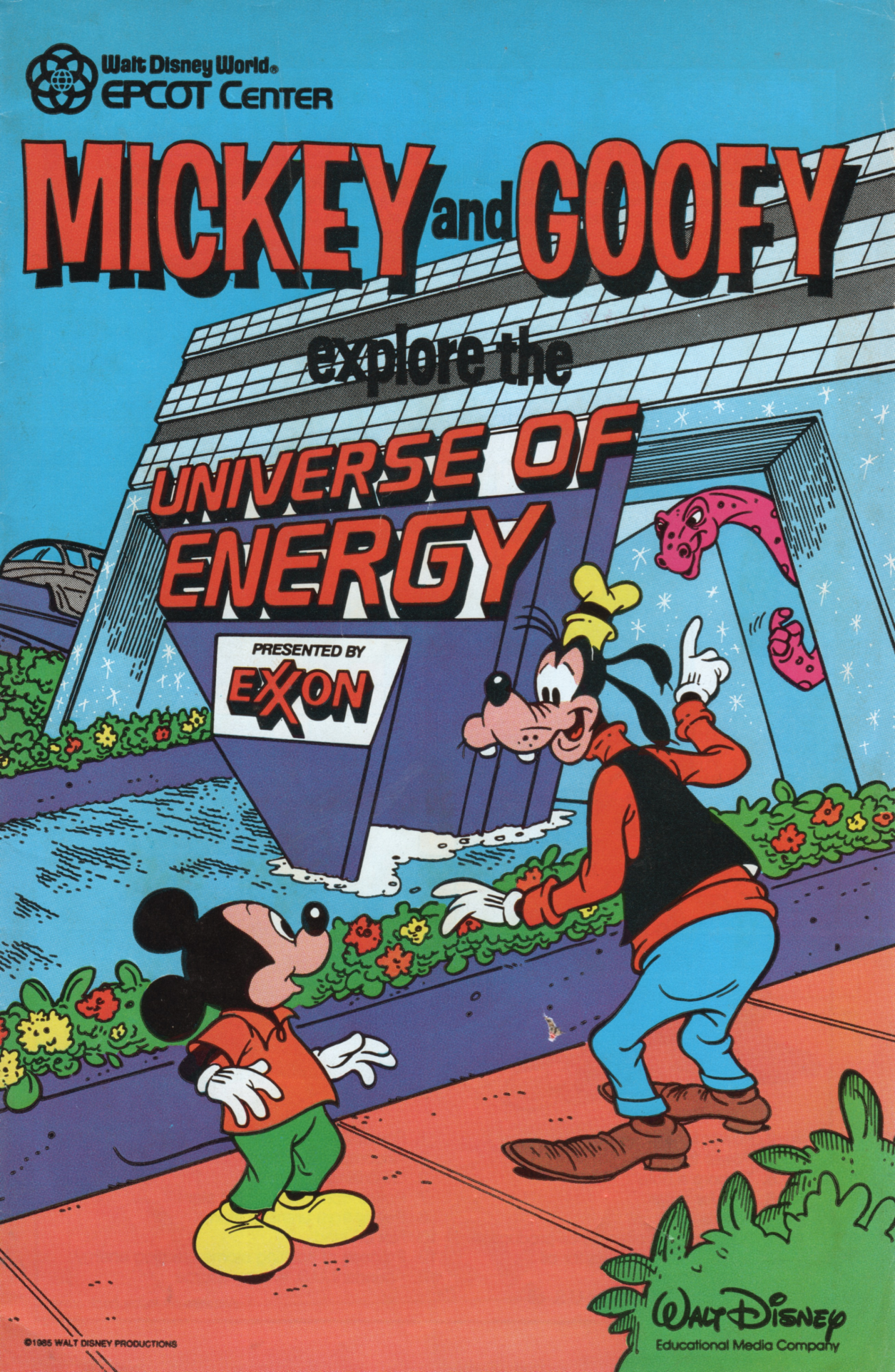
Walt Disney World®
EPCOT Center

MICKEY and GOOFY explore the UNIVERSE OF ENERGY



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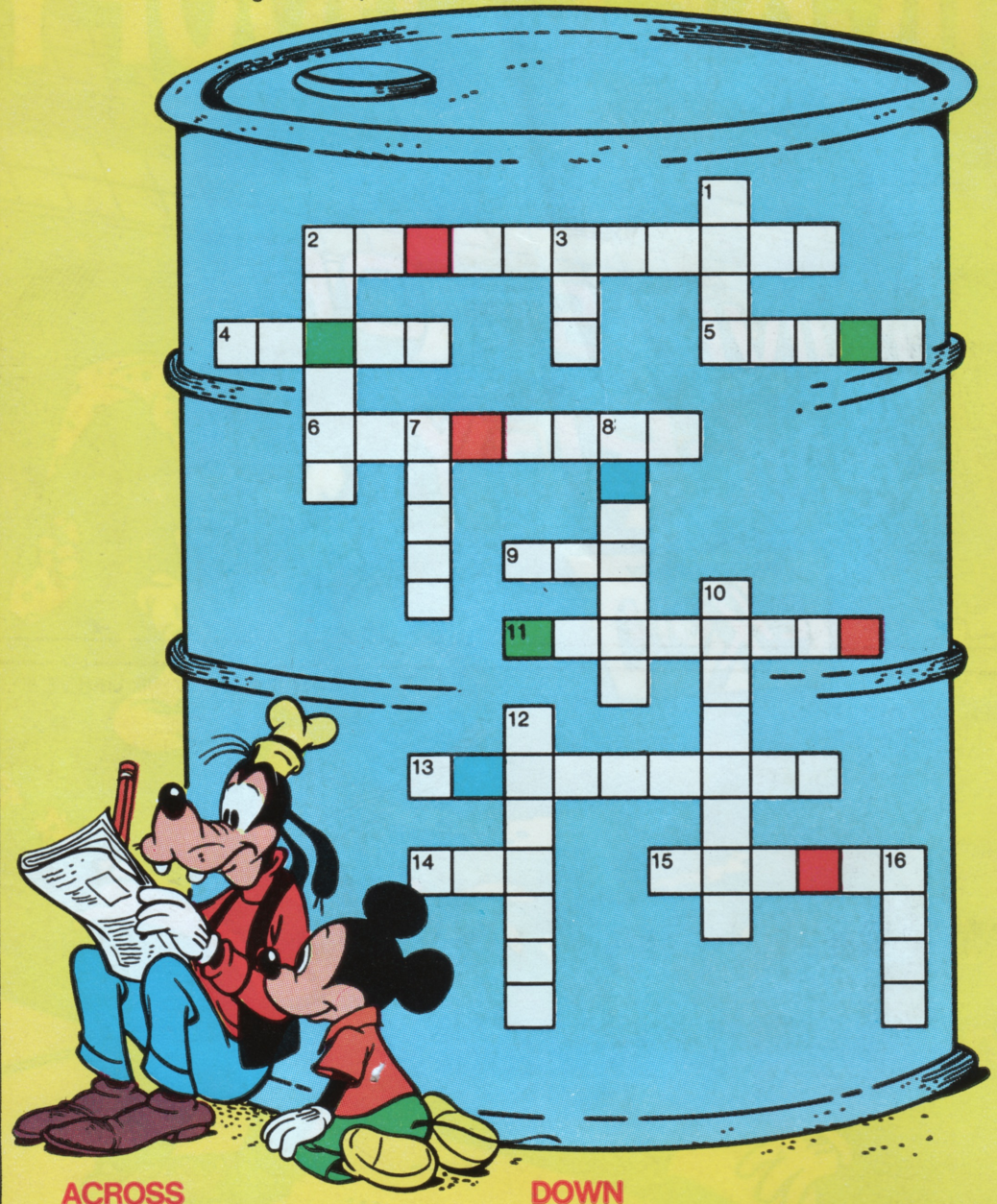
Have a Barrel of Fun... Go on a Word Quest!

Complete the puzzle by writing in the correct words that go across and down. When you're finished, unscramble the letters in the colored squares. You'll soon discover what America's single most important fuel for the rest of the 20th Century will be!



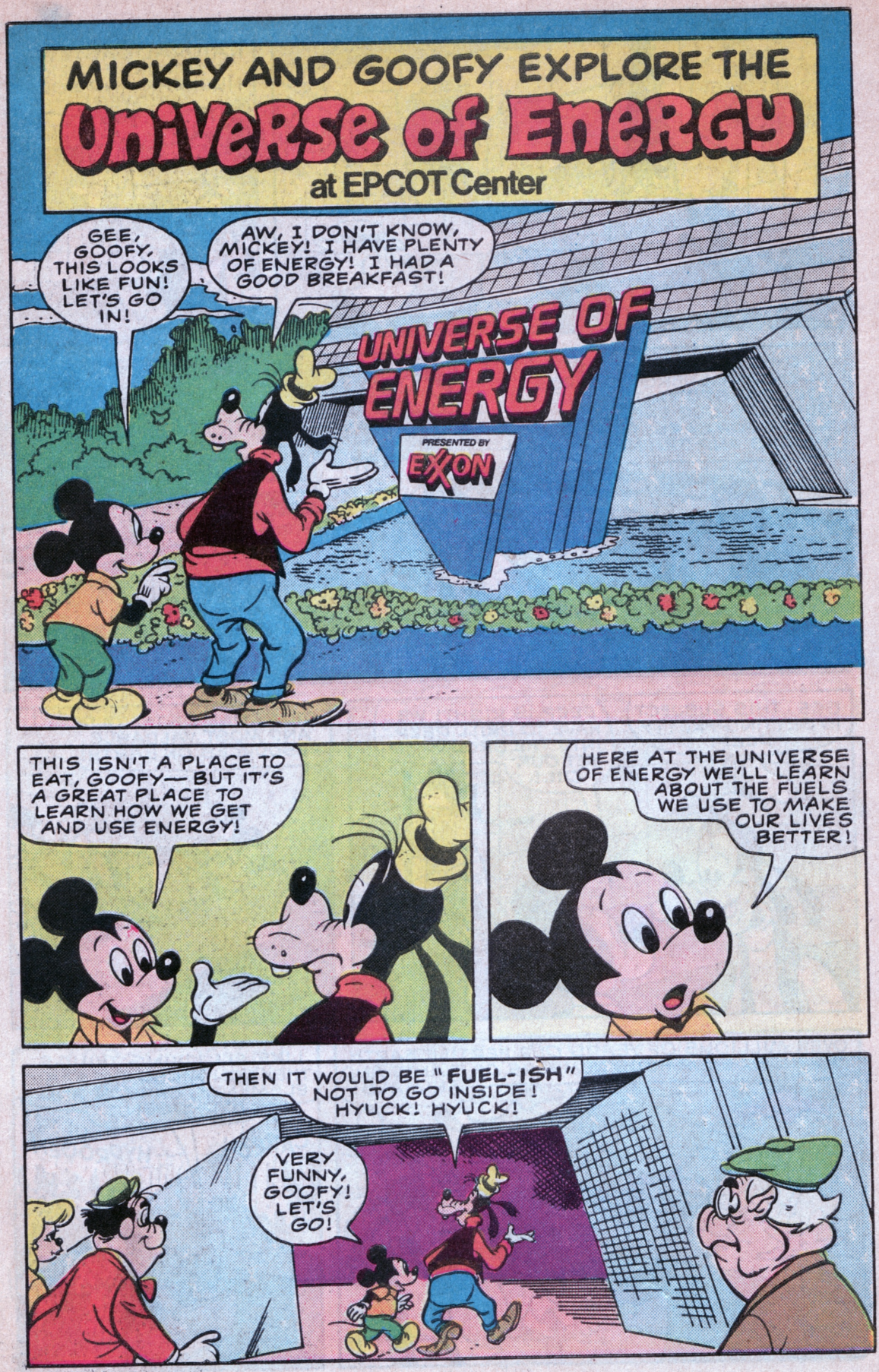
ACROSS

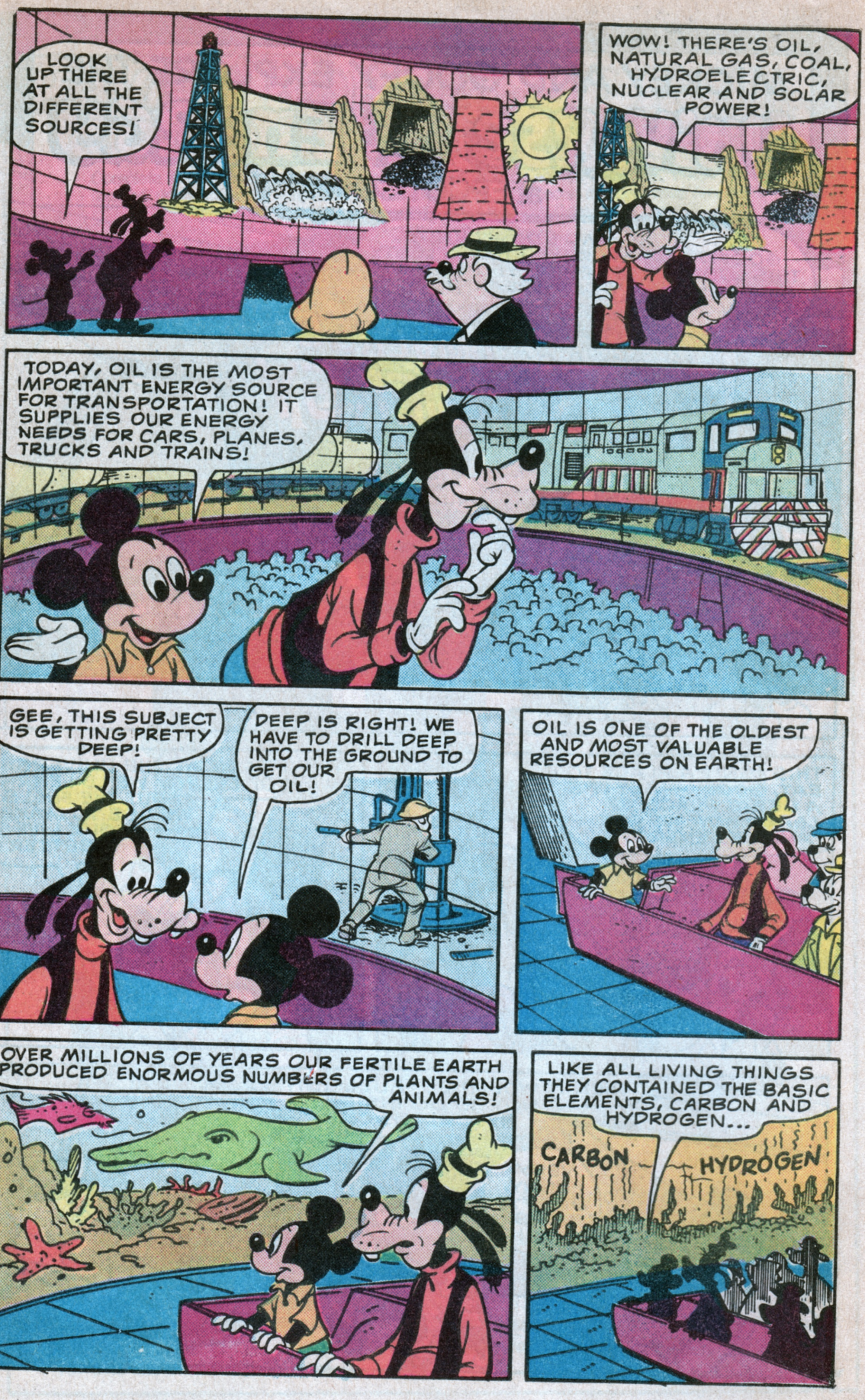
2. Power for the TV
4. Power from water
5. To bore a hole
6. Fuel for a car
9. A car's lubricant
11. A support for offshore oil production
13. Vessel that searches for oil
14. Fuel for cooking
15. One site of abundant U.S. oil

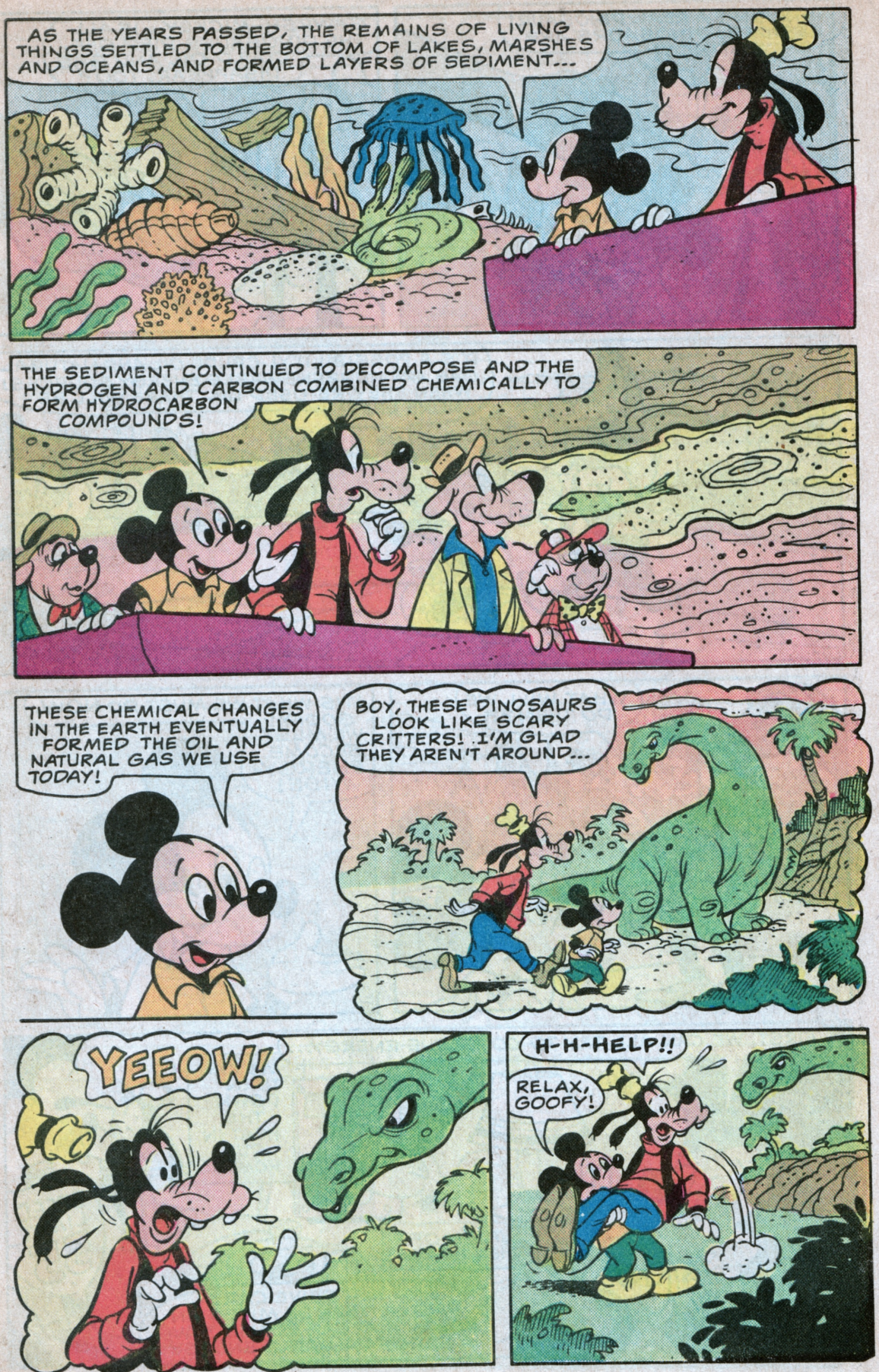
DOWN

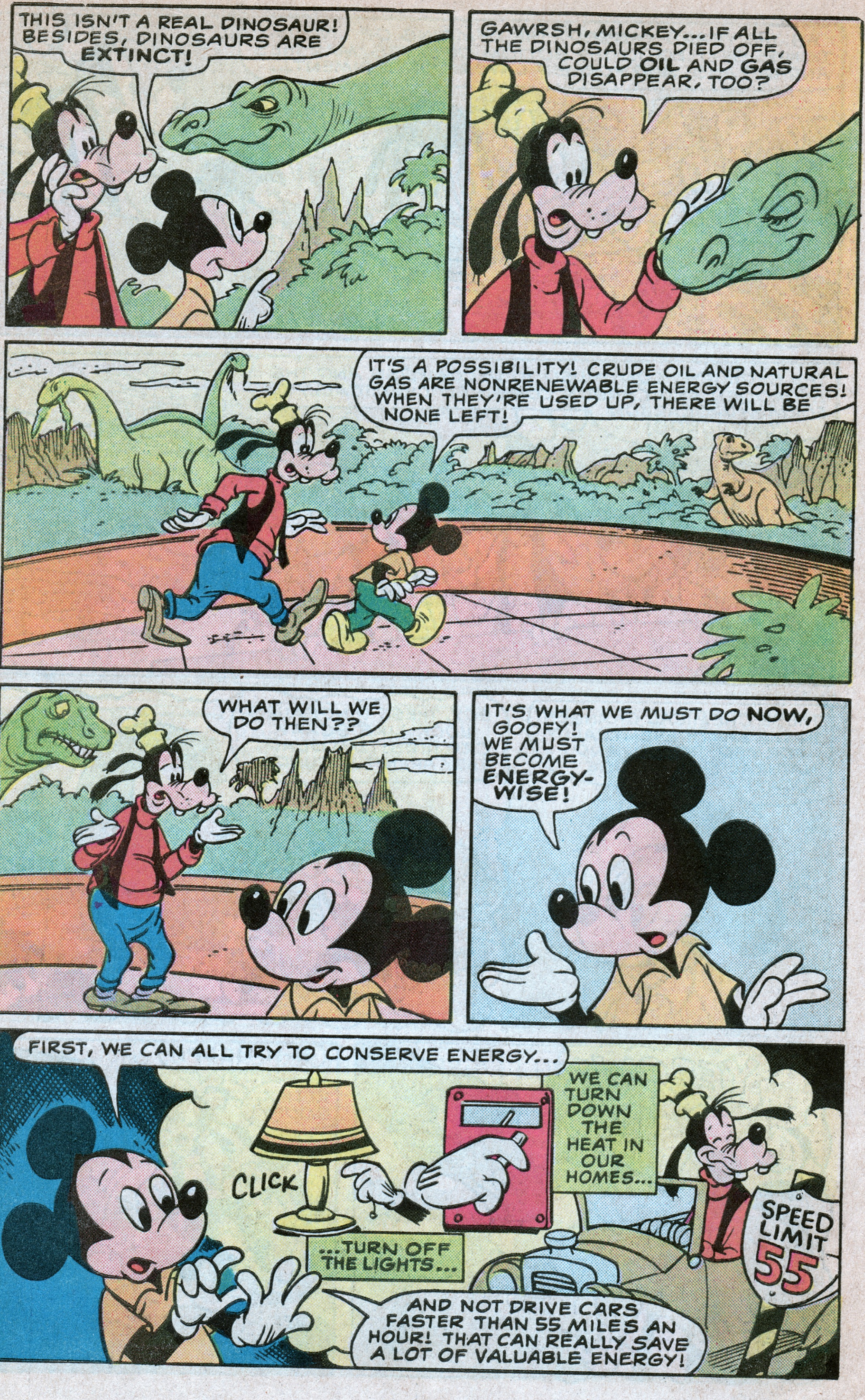
1. Power from "out of thin air"
2. Accomplishes work
3. Oil drilling apparatus
7. Power from our nearest star
8. Power from uranium atoms
10. Not on land
12. Process of splitting atoms creating energy
16. Abundant U.S. energy source

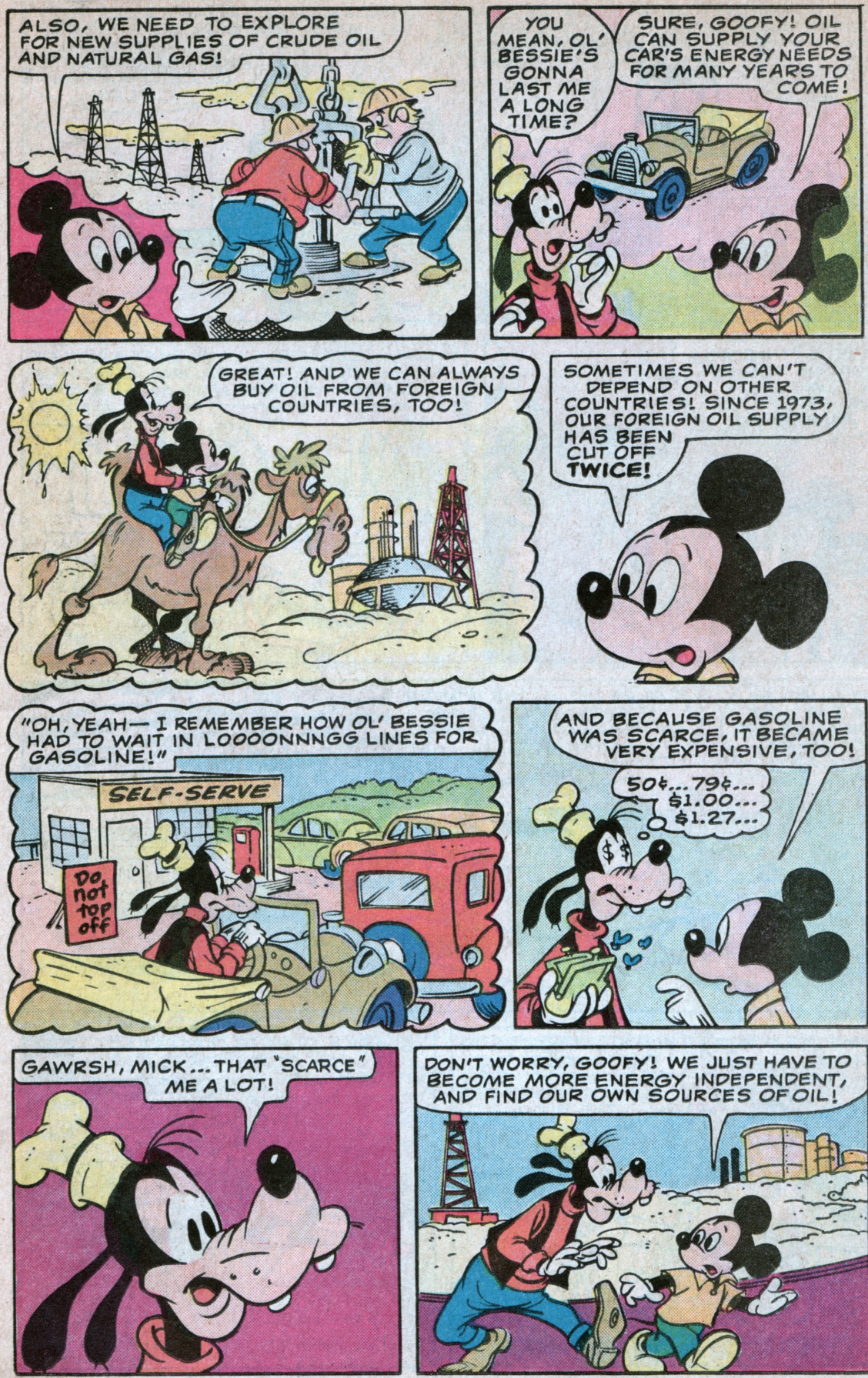
Answers on inside back cover


MICKEY AND GOOFY EXPLORE THE
UNIVERSE OF ENERGY
at EPCOT Center
GEE, GOOFY, THIS LOOKS LIKE FUN! LET'S GO IN!
AW, I DON'T KNOW, MICKEY! I HAVE PLENTY OF ENERGY! I HAD A GOOD BREAKFAST!
UNIVERSE OF ENERGY
PRESENTED BY
EXXON
THIS ISN'T A PLACE TO EAT, GOOFY— BUT IT'S A GREAT PLACE TO LEARN HOW WE GET AND USE ENERGY!
HERE AT THE UNIVERSE OF ENERGY WE'LL LEARN ABOUT THE FUELS WE USE TO MAKE OUR LIVES BETTER!
THEN IT WOULD BE "FUEL-ISH" NOT TO GO INSIDE! HYUCK! HYUCK!
VERY FUNNY, GOOFY! LET'S GO!

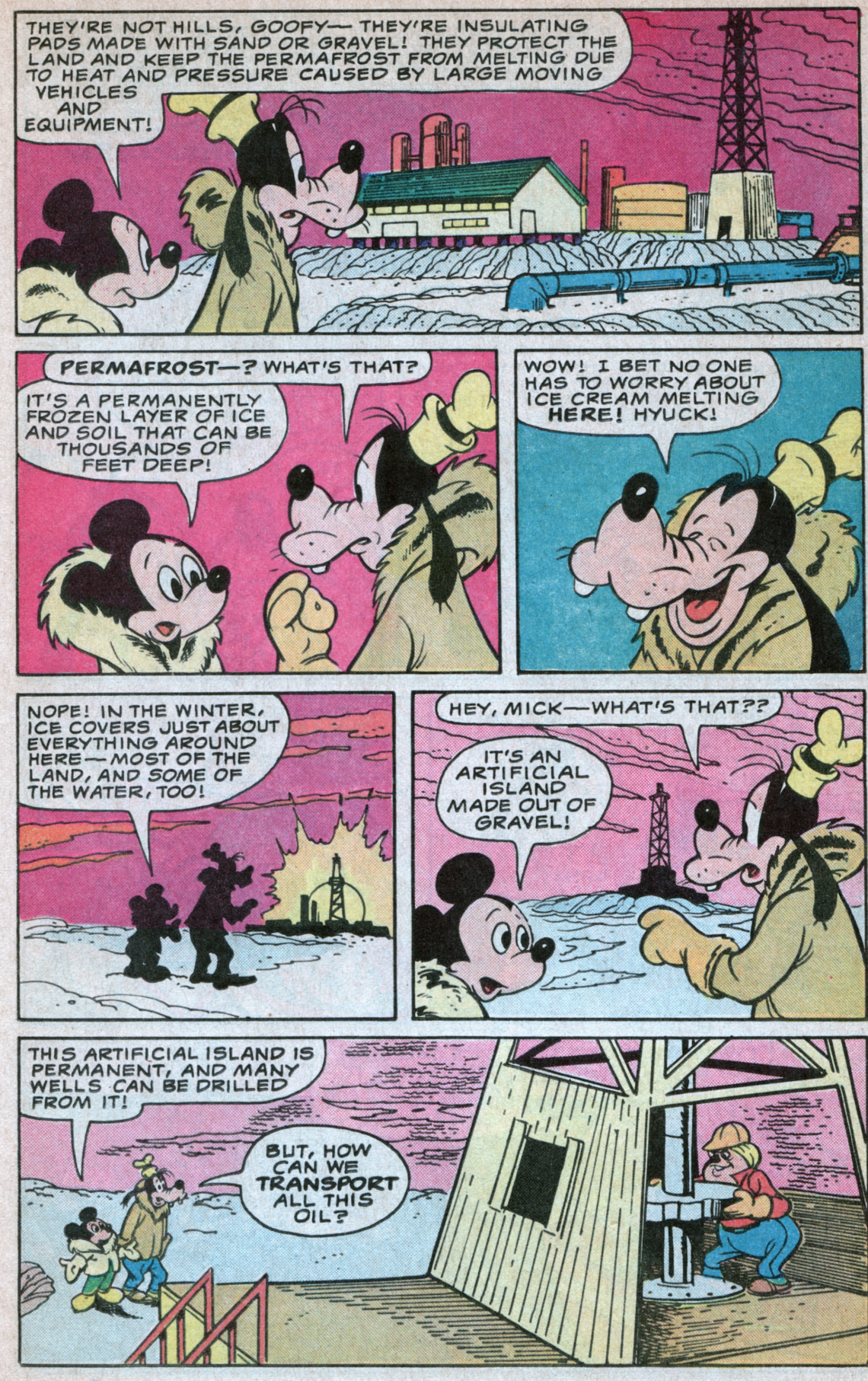

LOOK UP THERE AT ALL THE DIFFERENT SOURCES!
WOW! THERE'S OIL, NATURAL GAS, COAL, HYDROELECTRIC, NUCLEAR AND SOLAR POWER!
TODAY, OIL IS THE MOST IMPORTANT ENERGY SOURCE FOR TRANSPORTATION! IT SUPPLIES OUR ENERGY NEEDS FOR CARS, PLANES, TRUCKS AND TRAINS!
GEE, THIS SUBJECT IS GETTING PRETTY DEEP!
DEEP IS RIGHT! WE HAVE TO DRILL DEEP INTO THE GROUND TO GET OUR OIL!
OIL IS ONE OF THE OLDEST AND MOST VALUABLE RESOURCES ON EARTH!
OVER MILLIONS OF YEARS OUR FERTILE EARTH PRODUCED ENORMOUS NUMBERS OF PLANTS AND ANIMALS!
LIKE ALL LIVING THINGS THEY CONTAINED THE BASIC ELEMENTS, CARBON AND HYDROGEN...
CARBON
HYDROGEN

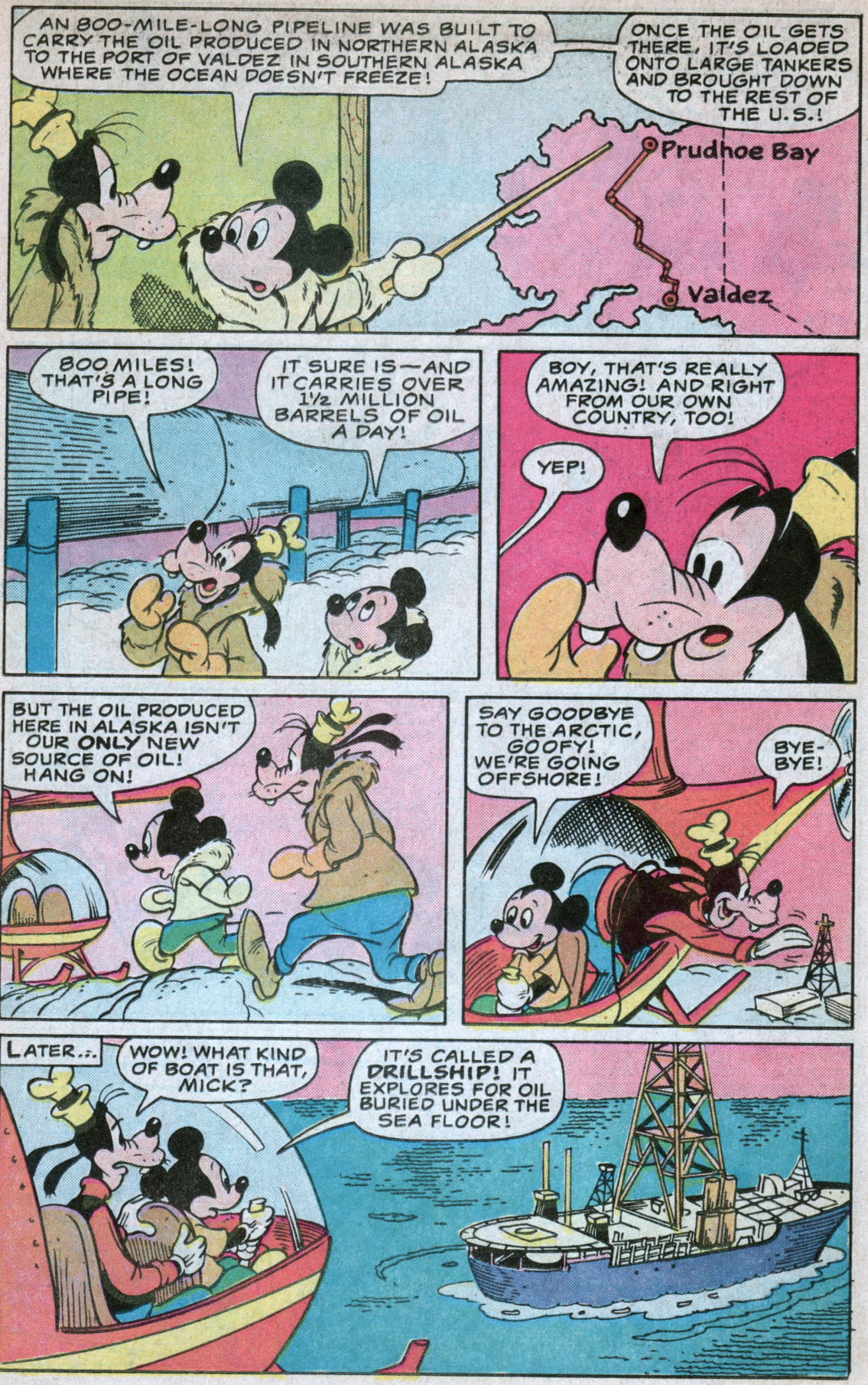

AS THE YEARS PASSED, THE REMAINS OF LIVING THINGS SETTLED TO THE BOTTOM OF LAKES, MARSHES AND OCEANS, AND FORMED LAYERS OF SEDIMENT...
THE SEDIMENT CONTINUED TO DECOMPOSE AND THE HYDROGEN AND CARBON COMBINED CHEMICALLY TO FORM HYDROCARBON COMPOUNDS!
THESE CHEMICAL CHANGES IN THE EARTH EVENTUALLY FORMED THE OIL AND NATURAL GAS WE USE TODAY!
BOY, THESE DINOSAURS LOOK LIKE SCARY CRITTERS! I'M GLAD THEY AREN'T AROUND...
YEEOW!
H-H-HELP!!
RELAX, GOOFY!


THIS ISN'T A REAL DINOSAUR! BESIDES, DINOSAURS ARE EXTINCT!
GAWRSH, MICKEY... IF ALL THE DINOSAURS DIED OFF, COULD OIL AND GAS DISAPPEAR, TOO?
IT'S A POSSIBILITY! CRUDE OIL AND NATURAL GAS ARE NONRENEWABLE ENERGY SOURCES! WHEN THEY'RE USED UP, THERE WILL BE NONE LEFT!
WHAT WILL WE DO THEN??
IT'S WHAT WE MUST DO NOW, GOOFY! WE MUST BECOME ENERGY-WISE!
FIRST, WE CAN ALL TRY TO CONSERVE ENERGY...
CLICK
...TURN OFF THE LIGHTS...
WE CAN TURN DOWN THE HEAT IN OUR HOMES...
SPEED LIMIT 55
AND NOT DRIVE CARS FASTER THAN 55 MILES AN HOUR! THAT CAN REALLY SAVE A LOT OF VALUABLE ENERGY!

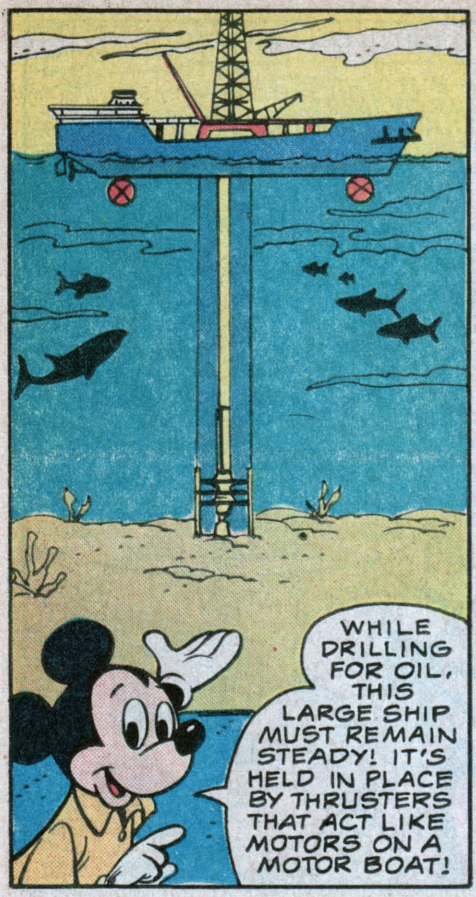

ALSO, WE NEED TO EXPLORE FOR NEW SUPPLIES OF CRUDE OIL AND NATURAL GAS!
YOU MEAN, OL' BESSIE'S GONNA LAST ME A LONG TIME?
SURE, GOOFY! OIL CAN SUPPLY YOUR CAR'S ENERGY NEEDS FOR MANY YEARS TO COME!
GREAT! AND WE CAN ALWAYS BUY OIL FROM FOREIGN COUNTRIES, TOO!
SOMETIMES WE CAN'T DEPEND ON OTHER COUNTRIES! SINCE 1973, OUR FOREIGN OIL SUPPLY HAS BEEN CUT OFF TWICE!
"OH, YEAH— I REMEMBER HOW OL' BESSIE HAD TO WAIT IN LOOOONNNGG LINES FOR GASOLINE!"
SELF-SERVE
Do not top off
AND BECAUSE GASOLINE WAS SCARCE, IT BECAME VERY EXPENSIVE, TOO!
50¢... 79¢... $1.00... $1.27...
GAWRSH, MICK... THAT "SCARCE" ME A LOT!
DON'T WORRY, GOOFY! WE JUST HAVE TO BECOME MORE ENERGY INDEPENDENT, AND FIND OUR OWN SOURCES OF OIL!

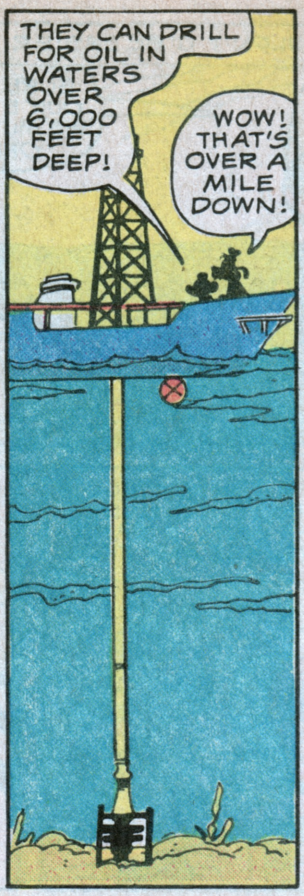
OIL COMPANIES MUST LOOK IN MORE DIFFICULT PLACES — LIKE THE ARCTIC AND UNDER THE SEA!
THE ARCTIC?! BRRR! I BET THEY HAVE "OIL-SICKLES" THERE! HYUCK! HYUCK! AND THEY EAT LOTS OF CHILI — AS IN COLD!!
WELL, THIS WILL WARM YOU UP! COME ON... WE'RE OFF TO ALASKA!
SOON... EXPERTS CLAIM THAT A LOT OF OUR FUTURE OIL WILL COME FROM ALASKA — EITHER ON LAND OR OFF-SHORE!
EXXON
IT MUST BE A BIG JOB DRILLING FOR OIL HERE, MICKEY!
IT SURE IS! IN THE WINTER IT GETS AS COLD AS 68 DEGREES BELOW ZERO FAHRENHEIT!
EXXON
PRUDHOE BAY
IT'S COLD AND DARK!
FOR EIGHT WEEKS IN THE WINTER, THE FOLKS IN NORTHERN ALASKA NEVER SEE THE SUN!
EXXON
ALASKA SURE IS DIFFERENT! JUST LOOK AT ALL THESE FUNNY LITTLE HILLS!

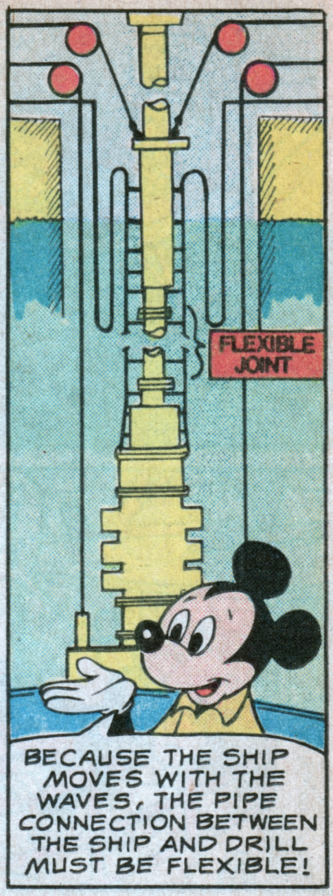

THEY'RE NOT HILLS, GOOFY— THEY'RE INSULATING PADS MADE WITH SAND OR GRAVEL! THEY PROTECT THE LAND AND KEEP THE PERMAFROST FROM MELTING DUE TO HEAT AND PRESSURE CAUSED BY LARGE MOVING VEHICLES AND EQUIPMENT!
PERMAFROST—? WHAT'S THAT?
IT'S A PERMANENTLY FROZEN LAYER OF ICE AND SOIL THAT CAN BE THOUSANDS OF FEET DEEP!
WOW! I BET NO ONE HAS TO WORRY ABOUT ICE CREAM MELTING HERE! HYUCK!
NOPE! IN THE WINTER, ICE COVERS JUST ABOUT EVERYTHING AROUND HERE— MOST OF THE LAND, AND SOME OF THE WATER, TOO!
HEY, MICK—WHAT'S THAT??
IT'S AN ARTIFICIAL ISLAND MADE OUT OF GRAVEL!
THIS ARTIFICIAL ISLAND IS PERMANENT, AND MANY WELLS CAN BE DRILLED FROM IT!
BUT, HOW CAN WE TRANSPORT ALL THIS OIL?

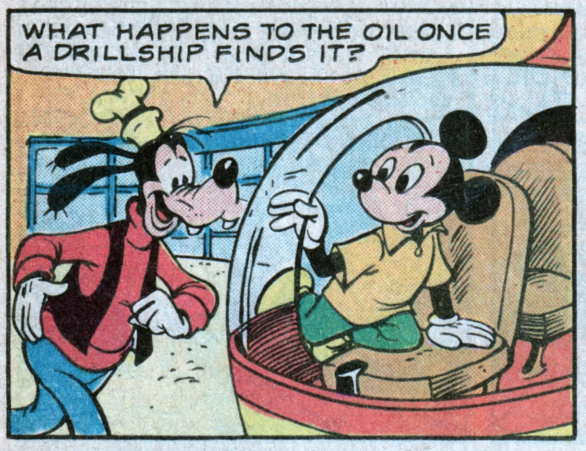

AN 800-MILE-LONG PIPELINE WAS BUILT TO CARRY THE OIL PRODUCED IN NORTHERN ALASKA TO THE PORT OF VALDEZ IN SOUTHERN ALASKA WHERE THE OCEAN DOESN'T FREEZE!
ONCE THE OIL GETS THERE, IT'S LOADED ONTO LARGE TANKERS AND BROUGHT DOWN TO THE REST OF THE U.S.!
Prudhoe Bay
Valdez
800 MILES! THAT'S A LONG PIPE!
IT SURE IS—AND IT CARRIES OVER 1½ MILLION BARRELS OF OIL A DAY!
BOY, THAT'S REALLY AMAZING! AND RIGHT FROM OUR OWN COUNTRY, TOO!
YEP!
BUT THE OIL PRODUCED HERE IN ALASKA ISN'T OUR ONLY NEW SOURCE OF OIL! HANG ON!
SAY GOODBYE TO THE ARCTIC, GOOFY! WE'RE GOING OFFSHORE!
BYE-BYE!
LATER...
WOW! WHAT KIND OF BOAT IS THAT, MICK?
IT'S CALLED A DRILLSHIP! IT EXPLORES FOR OIL BURIED UNDER THE SEA FLOOR!

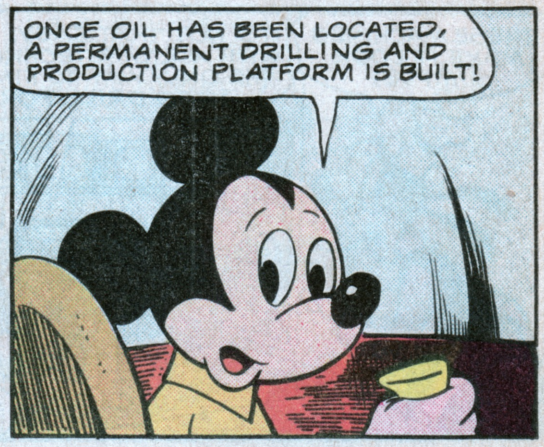
WOULDN'T IT BE EASIER TO DRILL ON LAND??
SURE—BUT TO MEET OUR ENERGY NEEDS WE MUST ALSO EXPLORE OFFSHORE OIL!
HOW CAN YOU TELL IF THERE'S OIL UNDER THE SEA? I CAN'T EVEN SEE ANY FISH!
SCIENTIFIC INSTRUMENTS ARE USED TO FIND ROCK FORMATIONS THAT MIGHT CONTAIN OIL!
THESE MACHINES MAKE IT LOOK SIMPLE!
IT'S NOT THAT EASY! EVEN WITH ALL THIS TECHNOLOGY THE ONLY WAY TO FIND OIL IS TO DRILL FOR IT!
LOOK AT THIS!! THE SHIP HAS A BIG HOLE IN IT! WE'RE GONNA SINK!
DON'T WORRY! THAT'S CALLED A MOON POOL!
FOR LUNAR LAPS? HYUCK!
NO, GOOFY! IT'S THE OPENING THROUGH WHICH THE DRILL PIPE IS LOWERED TO FIND OIL!

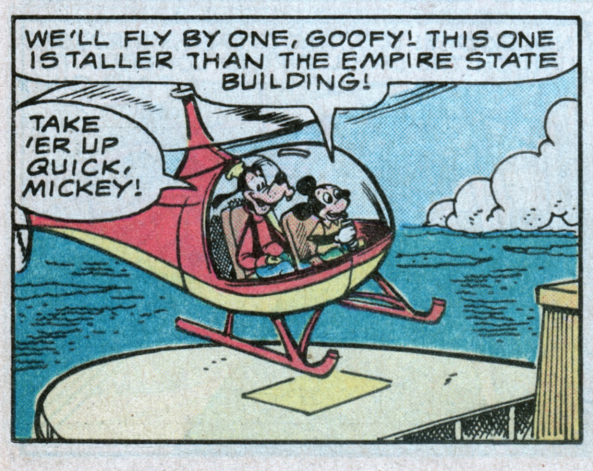

WHILE DRILLING FOR OIL, THIS LARGE SHIP MUST REMAIN STEADY! IT'S HELD IN PLACE BY THRUSTERS THAT ACT LIKE MOTORS ON A MOTOR BOAT!

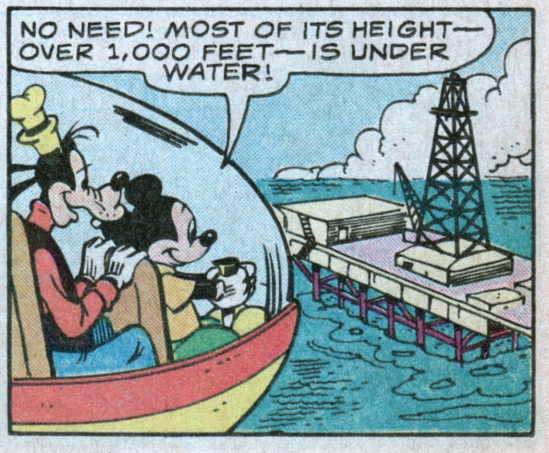

THEY CAN DRILL FOR OIL IN WATERS OVER 6,000 FEET DEEP!
WOW! THAT'S OVER A MILE DOWN!

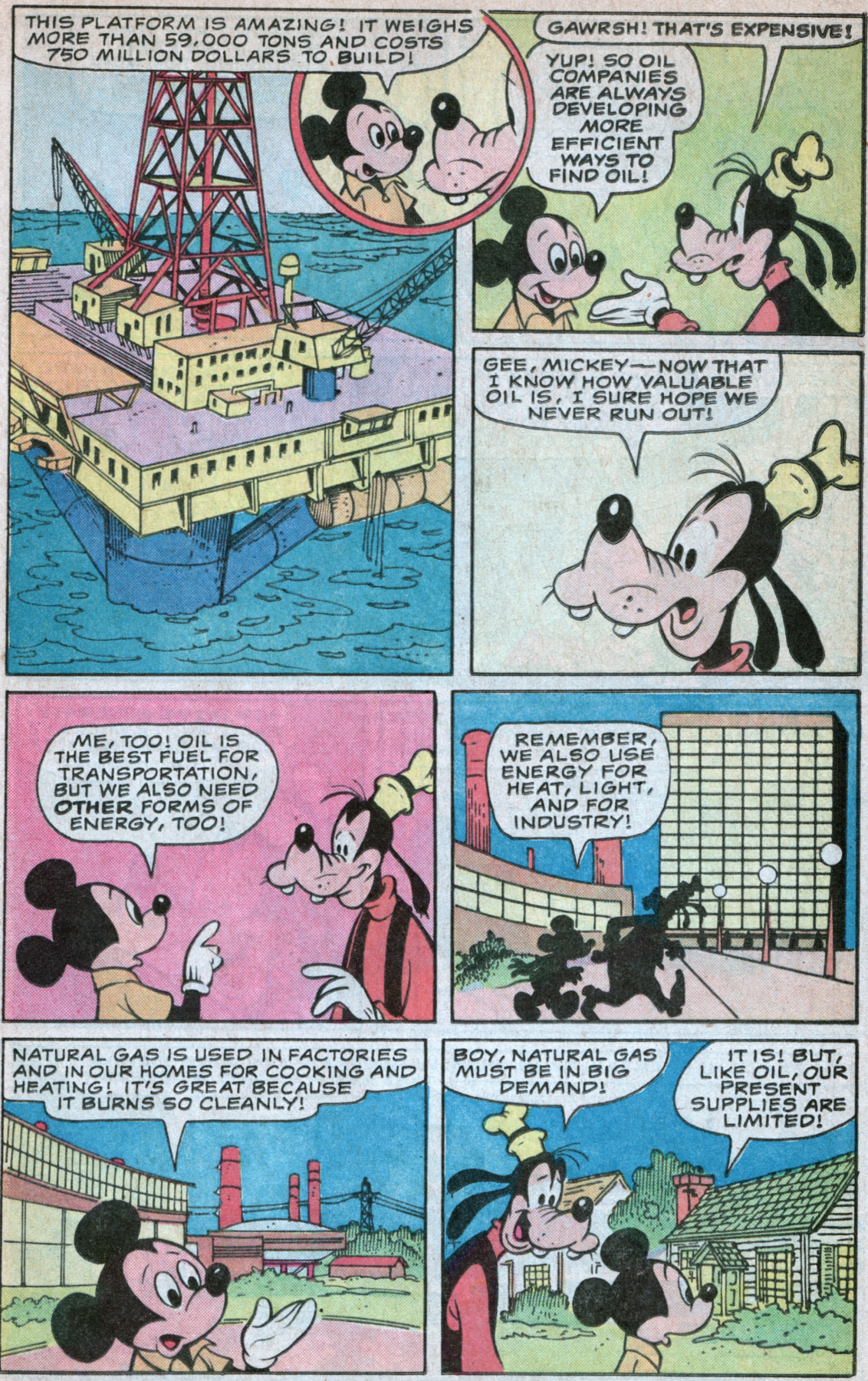

FLEXIBLE JOINT
BECAUSE THE SHIP MOVES WITH THE WAVES, THE PIPE CONNECTION BETWEEN THE SHIP AND DRILL MUST BE FLEXIBLE!

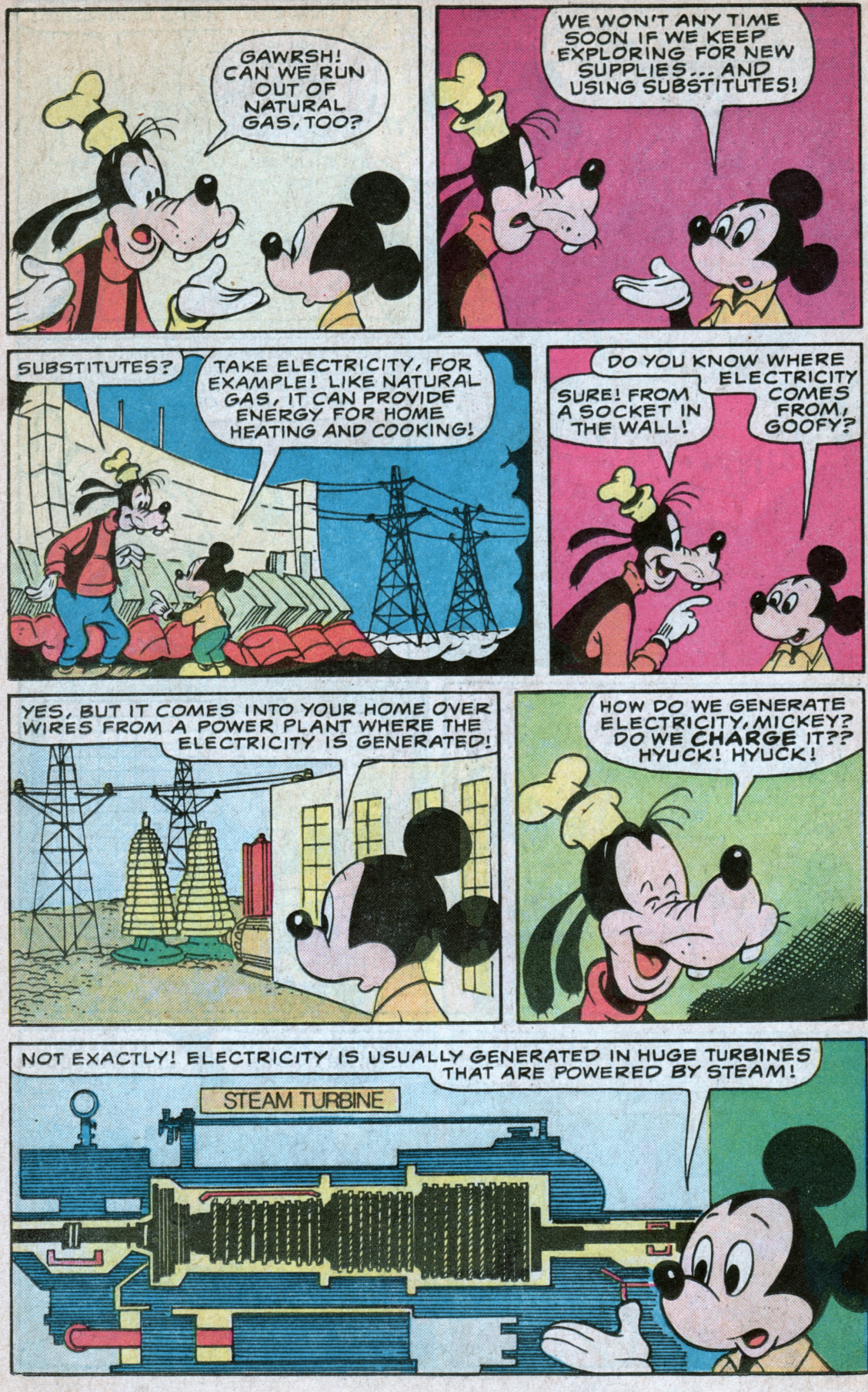

WHAT HAPPENS TO THE OIL ONCE A DRILLSHIP FINDS IT?

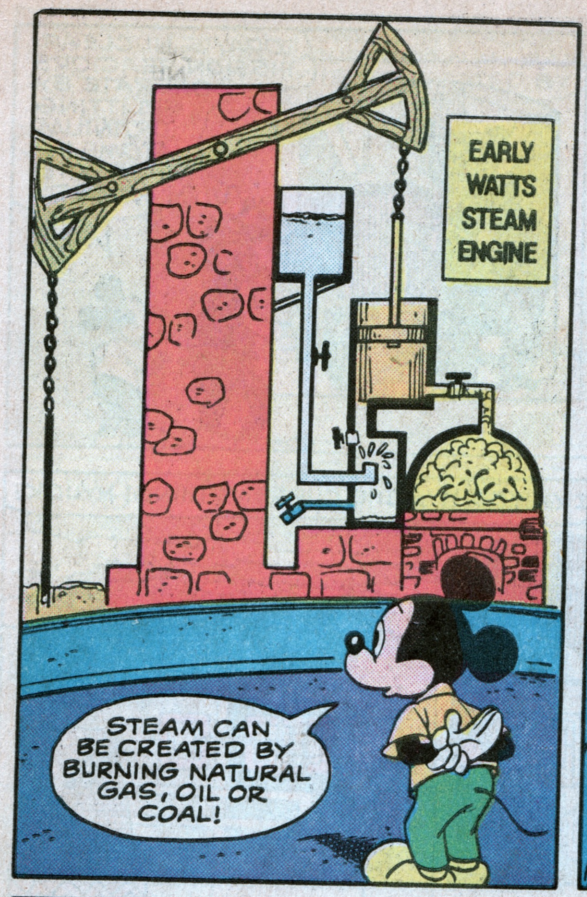

ONCE OIL HAS BEEN LOCATED, A PERMANENT DRILLING AND PRODUCTION PLATFORM IS BUILT!

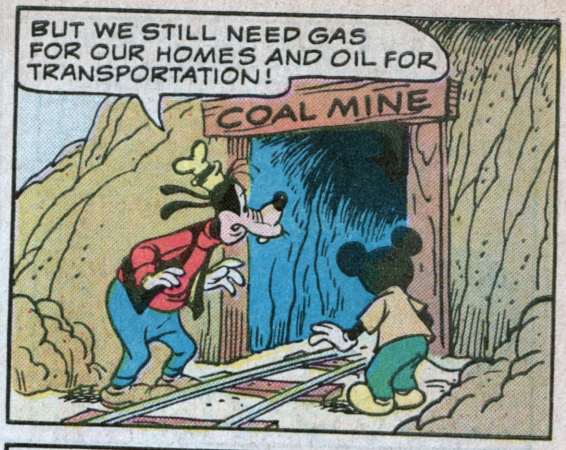

WE'LL FLY BY ONE, GOOFY! THIS ONE IS TALLER THAN THE EMPIRE STATE BUILDING!
TAKE 'ER UP QUICK, MICKEY!

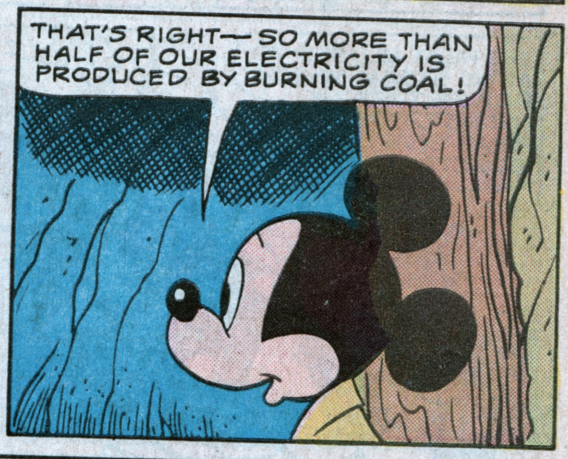

NO NEED! MOST OF ITS HEIGHT— OVER 1,000 FEET—IS UNDER WATER!

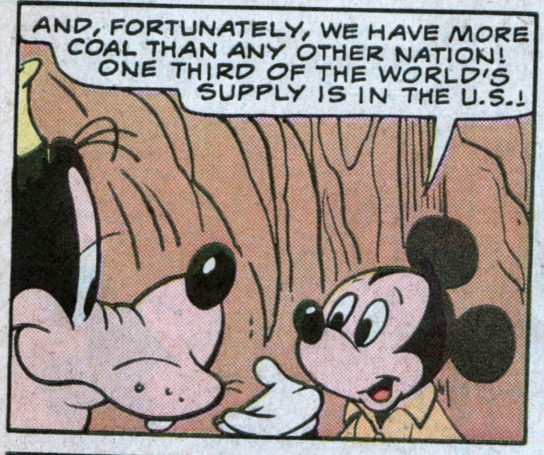

THIS PLATFORM IS AMAZING! IT WEIGHS MORE THAN 59,000 TONS AND COSTS 750 MILLION DOLLARS TO BUILD!
GAWRSH! THAT'S EXPENSIVE!
YUP! SO OIL COMPANIES ARE ALWAYS DEVELOPING MORE EFFICIENT WAYS TO FIND OIL!
GEE, MICKEY—NOW THAT I KNOW HOW VALUABLE OIL IS, I SURE HOPE WE NEVER RUN OUT!
ME, TOO! OIL IS THE BEST FUEL FOR TRANSPORTATION, BUT WE ALSO NEED OTHER FORMS OF ENERGY, TOO!
REMEMBER, WE ALSO USE ENERGY FOR HEAT, LIGHT, AND FOR INDUSTRY!
NATURAL GAS IS USED IN FACTORIES AND IN OUR HOMES FOR COOKING AND HEATING! IT'S GREAT BECAUSE IT BURNS SO CLEANLY!
BOY, NATURAL GAS MUST BE IN BIG DEMAND!
IT IS! BUT, LIKE OIL, OUR PRESENT SUPPLIES ARE LIMITED!

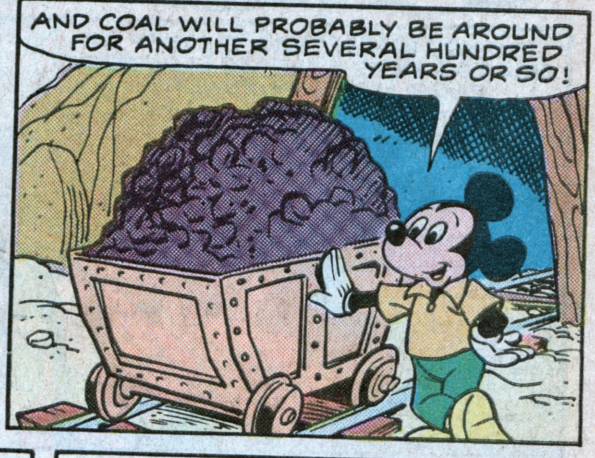

GAWRSH! CAN WE RUN OUT OF NATURAL GAS, TOO?
WE WON'T ANY TIME SOON IF WE KEEP EXPLORING FOR NEW SUPPLIES... AND USING SUBSTITUTES!
SUBSTITUTES?
TAKE ELECTRICITY, FOR EXAMPLE! LIKE NATURAL GAS, IT CAN PROVIDE ENERGY FOR HOME HEATING AND COOKING!
DO YOU KNOW WHERE ELECTRICITY COMES FROM, GOOFY?
SURE! FROM A SOCKET IN THE WALL!
YES, BUT IT COMES INTO YOUR HOME OVER WIRES FROM A POWER PLANT WHERE THE ELECTRICITY IS GENERATED!
HOW DO WE GENERATE ELECTRICITY, MICKEY? DO WE CHARGE IT?? HYUCK! HYUCK!
NOT EXACTLY! ELECTRICITY IS USUALLY GENERATED IN HUGE TURBINES THAT ARE POWERED BY STEAM!
STEAM TURBINE

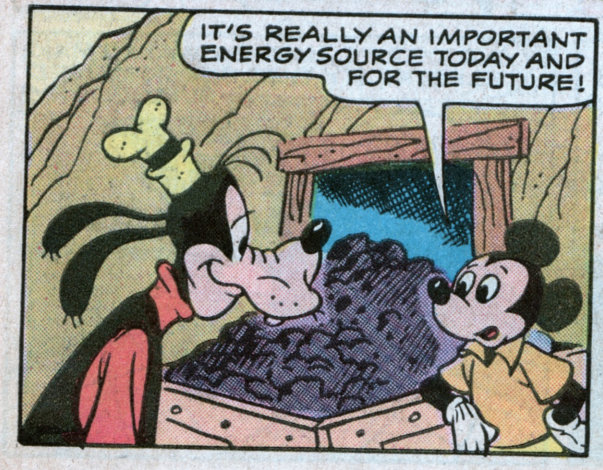

EARLY WATTS STEAM ENGINE
STEAM CAN BE CREATED BY BURNING NATURAL GAS, OIL OR COAL!

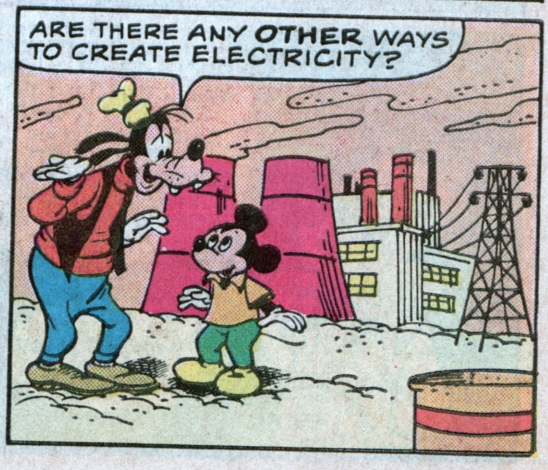

BUT WE STILL NEED GAS FOR OUR HOMES AND OIL FOR TRANSPORTATION!
COAL MINE

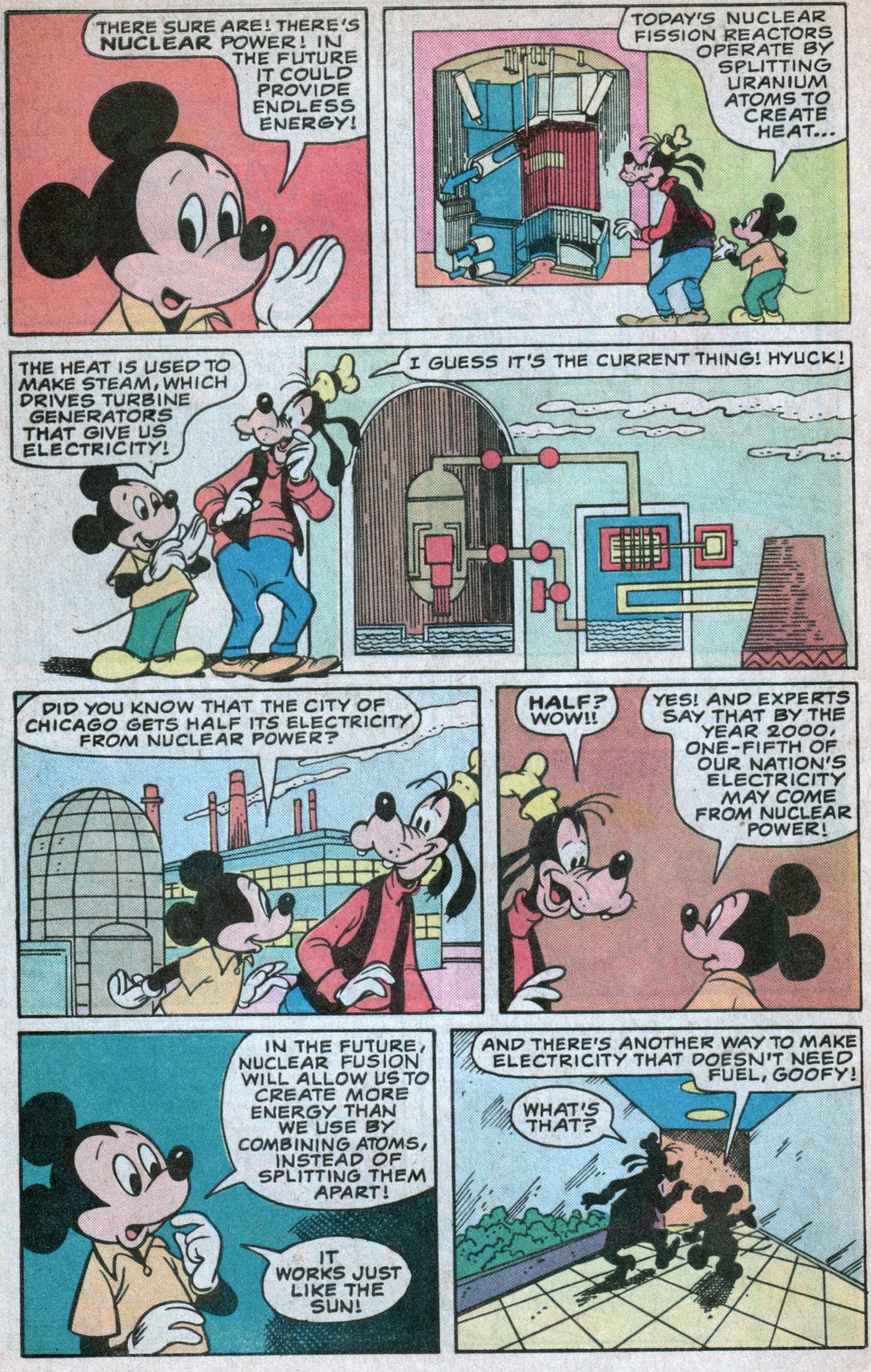

THAT'S RIGHT— SO MORE THAN HALF OF OUR ELECTRICITY IS PRODUCED BY BURNING COAL!


AND, FORTUNATELY, WE HAVE MORE COAL THAN ANY OTHER NATION! ONE THIRD OF THE WORLD'S SUPPLY IS IN THE U.S.!

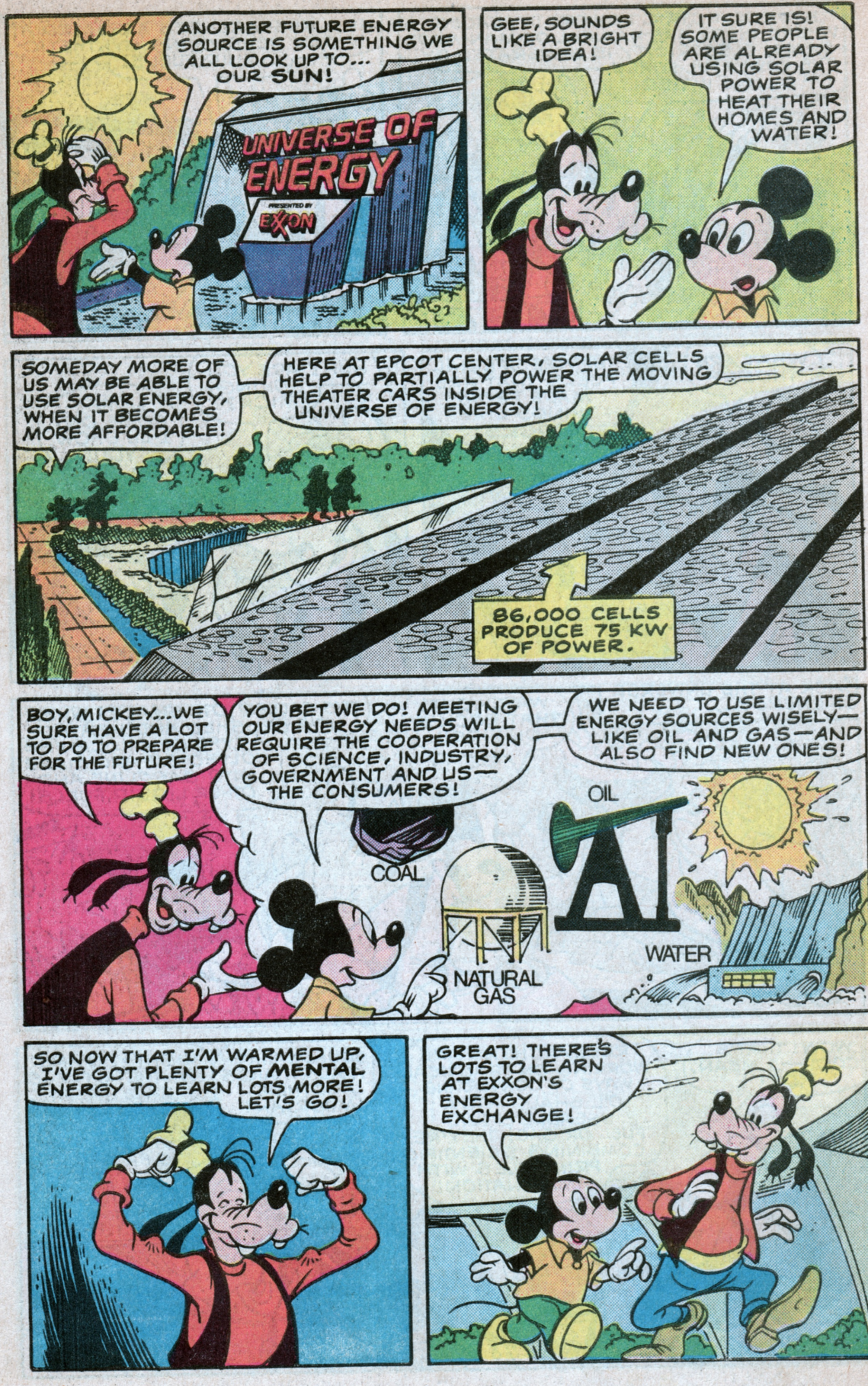

AND COAL WILL PROBABLY BE AROUND FOR ANOTHER SEVERAL HUNDRED YEARS OR SO!


IT'S REALLY AN IMPORTANT ENERGY SOURCE TODAY AND FOR THE FUTURE!


ARE THERE ANY OTHER WAYS TO CREATE ELECTRICITY?

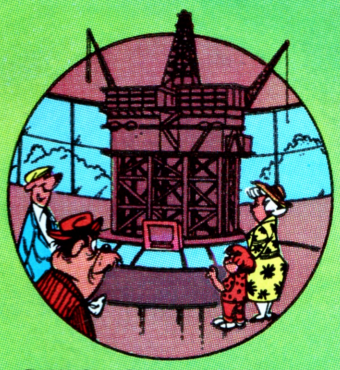

THERE SURE ARE! THERE'S NUCLEAR POWER! IN THE FUTURE IT COULD PROVIDE ENDLESS ENERGY!
TODAY'S NUCLEAR FISSION REACTORS OPERATE BY SPLITTING URANIUM ATOMS TO CREATE HEAT...
THE HEAT IS USED TO MAKE STEAM, WHICH DRIVES TURBINE GENERATORS THAT GIVE US ELECTRICITY!
I GUESS IT'S THE CURRENT THING! HYUCK!
DID YOU KNOW THAT THE CITY OF CHICAGO GETS HALF ITS ELECTRICITY FROM NUCLEAR POWER?
HALF? WOW!!
YES! AND EXPERTS SAY THAT BY THE YEAR 2000, ONE-FIFTH OF OUR NATION'S ELECTRICITY MAY COME FROM NUCLEAR POWER!
IN THE FUTURE, NUCLEAR FUSION WILL ALLOW US TO CREATE MORE ENERGY THAN WE USE BY COMBINING ATOMS, INSTEAD OF SPLITTING THEM APART!
IT WORKS JUST LIKE THE SUN!
AND THERE'S ANOTHER WAY TO MAKE ELECTRICITY THAT DOESN'T NEED FUEL, GOOFY!
WHAT'S THAT?

HYDROELECTRIC POWER! IN PLACES WHERE THERE ARE NATURAL OR MAN-MADE DAMS, ELECTRICITY IS GENERATED BY THE POWERFUL FORCE OF FALLING WATER!
LIKE NIAGARA FALLS!
AND, RESEARCHERS ARE HARD AT WORK DEVELOPING SYNTHETIC LIQUID FUELS!
SYNTHETIC GAS
SYNTHETIC Petroleum
COAL
WHAT ARE THOSE?
THEY'RE SPECIAL FUELS THAT ARE MADE FROM THINGS LIKE ROCKS!
HUH? ARE YOU JOKING, MICK??
NOPE! COME ON, I'LL SHOW YOU!
BACK AT THE UNIVERSE OF ENERGY...
WATCH OUT! THAT ROCK'S ON FIRE!!
IT'S CALLED OIL SHALE! WHEN IT'S CRUSHED AND HEATED, A TYPE OF OIL CAN BE COLLECTED AND MADE INTO GASOLINE AND OTHER LIQUID FUELS!
WOW! THAT'S COOL—I MEAN, HOT!
RESEARCHERS ARE WORKING ON PRACTICAL WAYS OF CONVERTING OIL SHALE INTO A USEABLE LIQUID FUEL OR GAS! THEY'RE COMBINING SCIENTIFIC PRINCIPLES WITH IMAGINATION!
SOUNDS LIKE IT ALSO TAKES ANOTHER IMPORTANT THING— MONEY!
RIGHT YOU ARE! SYNTHETIC FUELS HAVE GREAT POTENTIAL! BUT, RIGHT NOW, THEY COST TOO MUCH TO PRODUCE!

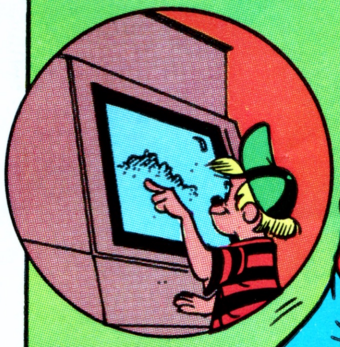

ANOTHER FUTURE ENERGY SOURCE IS SOMETHING WE ALL LOOK UP TO... OUR SUN!
UNIVERSE OF ENERGY
PRESENTED BY EXXON
GEE, SOUNDS LIKE A BRIGHT IDEA!
IT SURE IS! SOME PEOPLE ARE ALREADY USING SOLAR POWER TO HEAT THEIR HOMES AND WATER!
SOMEDAY MORE OF US MAY BE ABLE TO USE SOLAR ENERGY, WHEN IT BECOMES MORE AFFORDABLE!
HERE AT EPCOT CENTER, SOLAR CELLS HELP TO PARTIALLY POWER THE MOVING THEATER CARS INSIDE THE UNIVERSE OF ENERGY!
86,000 CELLS PRODUCE 75 KW OF POWER.
BOY, MICKEY...WE SURE HAVE A LOT TO DO TO PREPARE FOR THE FUTURE!
YOU BET WE DO! MEETING OUR ENERGY NEEDS WILL REQUIRE THE COOPERATION OF SCIENCE, INDUSTRY, GOVERNMENT AND US— THE CONSUMERS!
WE NEED TO USE LIMITED ENERGY SOURCES WISELY— LIKE OIL AND GAS—AND ALSO FIND NEW ONES!
COAL
OIL
NATURAL GAS
WATER
SO NOW THAT I'M WARMED UP, I'VE GOT PLENTY OF MENTAL ENERGY TO LEARN LOTS MORE! LET'S GO!
GREAT! THERE'S LOTS TO LEARN AT EXXON'S ENERGY EXCHANGE!

Energy Exchange

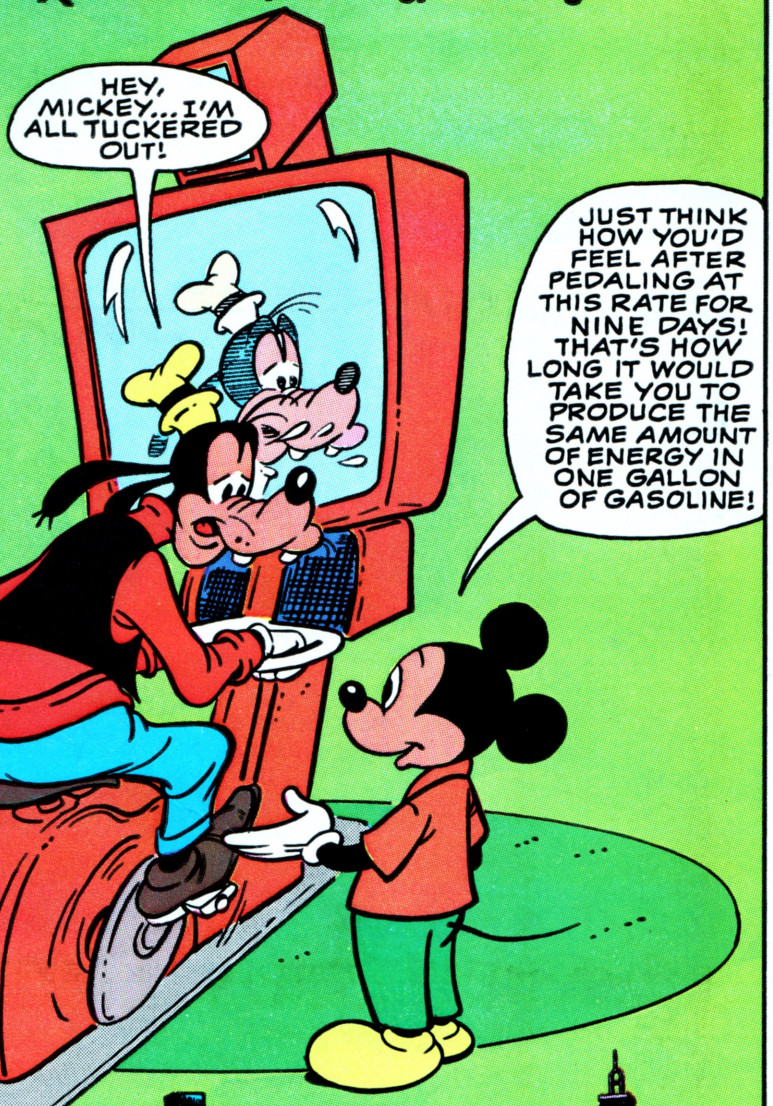
Presented by EXXON to add to your energy knowledge.

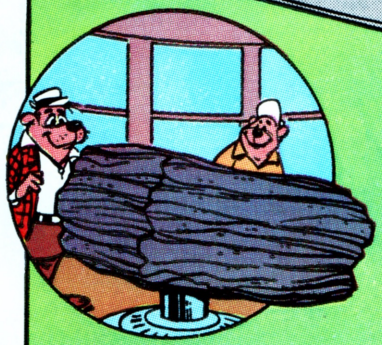


OFFSHORE DRILLING

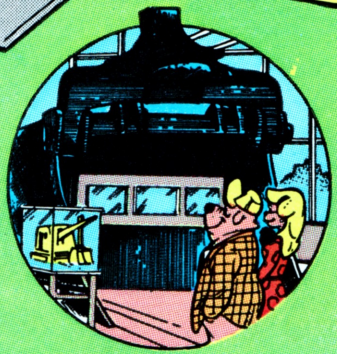


ENERGY INFORMATION TERMINALS

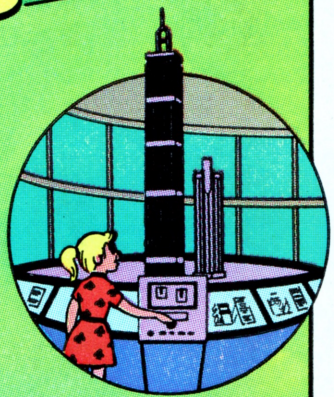




OIL SHALE



COAL



NUCLEAR

ACROSS—2. Electricity, 4. Steam, 5. Drill, 6. Gasoline, 9. Oil, 11. Platform, 13. Drillship, 14. Gas, 15. Arctic.
DOWN—1. Wind, 2. Energy, 3. Rig, 7. Solar, 8. Nuclear, 10. Offshore, 12. Fission, 16. Coal.
The word: PETROLEUM

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